

## **On the State-of-the-Art in Ti-Alloy Development Tools**

Pete Collins

Director of Technology

Quad Cities Manufacturing Laboratory (QCML)

### **Abstract**

Current and next generation Ti-based alloys have an attractive balance of properties, but their use is often limited due to their cost. In addition, their complex multi-component and multi-phase nature makes the fundamental understanding of their composition-microstructure- property relationships rather challenging, hindering the development of next-generation alloys. This talk will present research highlights of some of the emerging technologies which make use of Ti-powder, a route which has the potential to reduce the cost of raw stock by more than 70%, to produce directly novel complex alloys. In addition, highlights from current DoD funded research for the provision of microstructurally-based predictive tools to predict the tensile and toughness properties in alpha+beta processed Ti-6Al-4V will be presented. In this research, the integration of computational tools and critical experimentation has resulted in the differentiation of which features affect the continuum material response from those which might contribute to the micromechanisms of fracture. Finally, a novel combinatorial approach leveraging the overlap between the powder processing routes and modeling tools will be presented. The application of this methodology to understanding the reason why Ti-6Al-4V has remained an alloy of choice for more almost 60 years will be discussed.

### **Biography**

Dr. Pete Collins, the new Director of Technology for the Quad Cities Manufacturing Laboratory (QCML), has focused on the role of microstructure on properties in Ti-based alloys for the past 10 years in his roles with the Center for the Accelerated Maturation of Materials (CMM) at The Ohio State University. In his most recent position as Associate Director, he helped oversee a research group of 15 graduate students, 4 staff members, and 5 undergraduate students. The research efforts were largely focused on DoD applications, particularly Air Force and Navy applications. He joined QCML in July 2009, and is working with Dr. Sears to launch this entity to help Rock Island Arsenal and the greater region. In addition to his knowledge of Ti-based alloys, he also brings experience using titanium powder in additive manufacturing technologies to QCML.

### **Awareness Coffee Talk (10 minutes) prior to presentation Small-Sized High-Quality Near Net-Shape Titanium Components**

Jim Sears

South Dakota School of Mines and Technology

Director of the Additive Manufacturing Laboratory

**Location:**



# Chicago Regional Chapter

Tuesday  
January 12, 2010

NIU Naperville campus  
1120 E. Diehl Rd.  
Room: 161 B  
Naperville, IL 60563  
Phone: (630) 577-9101

### **Tentative Schedule:**

4:30-5:30 pm Executive Committee Meeting  
5:30-6:30 pm Hospitality Hour  
6:30-7:30 pm Dinner Followed by Presentation

### **Directions:**

From I-88, exit Naperville Road going south. Turn right onto Diehl Road. Turn left on Center Point Circle and then left into the NIU parking lot. Parking is free; no permits are needed.

**\*\*\* RSVP by Friday, Jan. 8th, 2010 \*\*\***

**Pre-registration by Friday prior to meeting: \$10. Registration at door: \$15**

**Pre-registration for Students: Free. Registration at door for Students: \$5**

**To make your reservation, please go to <http://www.chicagoasm.org/>**